Navigating the Future through Play: An Exploration of a CIB-Supported Serious Game

Simon Brauner [a], *Janina Moschner* [b], *Fabian Hölzlberger* [c], *Anja Brumme* [c], *Hannah Kosow* [b], *Stefan Vögele* [b], *Wolfgang Hauser* [b], *Dirk Rübbelke* [c]

(a) Forschungszentrum Jülich, Germany
(b) Zirius – University of Stuttgart, Germany
(c) Technische Universität Bergakademie Freiberg, Germany

Presenting author email: s.brauner@fz-juelich.de

Summary

Cross-Impact Balance Analysis (CIB) is a useful tool for exploring potential futures by generating and assessing multiple scenarios (Weimer-Jehle, 2024). However, CIB uses a specific balancing algorithm, which is usually computer-calculated, to determine scenario creation based on internal consistency. To escape this determinism, participatory modelling was applied throughout the process from creating a matrix to assessing interrelations between its elements, up to using it in form of a serious game (Jean et al., 2018). Thus, the creation of both the CIB matrix and the scenarios to be played out by participants can be co-produced with experts or stakeholders. This work will explore this new approach, its implementation, and provide early insights into the creation and play of a CIB-supported serious game in a joint project.

Introduction

Navigating complex and uncertain futures is an ongoing challenge. CIB can help generate ideas about cases characterised by uncertainty and complexity. However, it has some limitations, primarily in terms of determinism (Weimer-Jehle, 2006) as the method will always have fixed results gained by the employed calculations. CIB does not directly structure or guide social processes such as discourse, cooperation and coordination; additional methods and techniques are required for such purposes. A serious game supported by CIB can bridge this gap by giving players control over exploring and assessing scenarios, while also fostering direct interactions between players. Thus, serious games can help to overcome the determinism of the method. In this framework, the results cannot be predicted in advance because they emerge during the participants' interactions. The notion of interaction is also illustrated in the conceptual image of the associated web application (see **Figure 1**) that can support online and in-person formats to discuss the future.

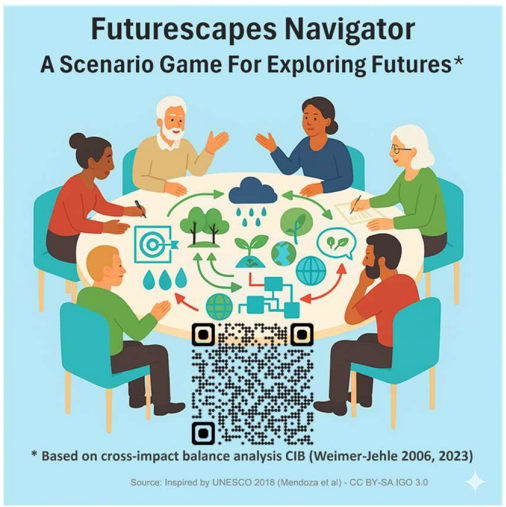

Figure 1. Illustrative concept image of the serious game

Methodology and Results

We combine the Cross-Impact Balance (CIB) method, which systematically explores the interactions and plausibility of future scenarios, with serious gaming. Through the medium of serious games, we aim to facilitate constructive dialogue on a crucial topic by engaging the interaction between participants.

The web application for the serious game is based on the functions of the Cross-Impact Balance method and is compatible with any CIB-matrix. Nevertheless, it works better with specially designed matrices, such as those based on future water conflicts, as used in the associated project. These already demonstrate how the gaming application can support a robust mix of scenarios. Serious games based on CIB can be played using the mentioned web-application *Futurescapes Navigator*. The primary objective of the project was to investigate how the CIB could be incorporated into a

serious game, and which aspects needed to be considered when designing the matrix and application to optimise their suitability for gaming. In particular, the focus was on openness to modifications and potential for interaction. In terms of participation, it was found that it was more important to make the matrix tangible, meaning the descriptors and variants should be understandable and usable by potential players. This is why co-design with stakeholders was beneficial in this case. In addition, the game's design was intended to allow for solo play or multiplayer mode, with the application being capable of processing input from participants and the computer. Further additions included the ability to set certain fixed states (variants) that frame the entire scenario (Kosow et al., 2024), as well as a detailed results screen depicting the choices and influences of all players, and providing individual impact scores. The transition from the general idea to the actual gaming software was supported through three case studies, each employing a slightly different approach and involving different individuals. Notwithstanding, all studies have demonstrated that such games have the capacity to forge connections between people, act as an icebreaker and encourage participation in the created scenarios by those affected, as they are an integral part of the process.

Conclusions

This new approach shows great promise as an addition to the cross-impact balance method, especially with regard to expert and stakeholder involvement. Researchers can use the serious game application to support their CIB development process (see the website listed in the acknowledgements). Games can also be used for subsequent research or educational purposes relating to the given research cases. Furthermore, by fostering the participatory side of CIB through this serious game, we intend to promote resilient and informed policymaking.

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Figure 1. The Futurescapes Navigator – A Scenario Game For Exploring Futures. https://www.zuwako.de/en/serious-game/ – Accessed on 06.02.2026